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# Exposure Changes Tastes: Quality of Life and Economic Freedom

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**Exposure Changes Tastes:  
Quality of Life and Economic Freedom**

by

Kayla Dawn Harris

**A report submitted in partial fulfillment  
of the requirements for the degree**

**of**

**MASTER OF SCIENCE**

**in**

**Economics**

**Approved:**

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**UTAH STATE UNIVERSITY**

**Logan, UT**

**2013**

# **Exposure Changes Tastes: Quality of Life and Economic Freedom**

By Kayla Dawn Harris

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# **Exposure Changes Tastes: Quality of Life and Economic Freedom**

By Kayla Dawn Harris

Quality of life indices attempt to measure the marginal value of characteristics that improve citizen's lives. This paper integrates the quality of life index created by Dr. Ryan Yonk with the Frasier Institute's Economic Freedom of North America and Mercatus' Freedom in the 50 States Index. Yonk's index combines five indicators, education, public safety, health, infrastructure, and economic development, into one aggregate Quality of Life Score. I find a positive relationship between Yonk's aggregate Quality of Life Score and the Frasier Institute's measures of aggregate Economic Freedom Indicators.

## **Acknowledgements**

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In Virginia Postrel's *The Substance of Style* she argues that

The more we invest in aesthetics, the less productive the economy is likely to appear ... We look at the official data and conclude we're poorer than we really are. Missing some of the economy's greatest advances, we believe the pessimists who say progress has effectively ended. (Location 2946).

Wealth statistics are generally not equipped to convey changes in the quality of the goods that are being sold. It is just this lack of a holistic understanding of how individual's needs and wants are being met that quality of life studies are attempting to fulfill. As Postrel argues there are advances that aren't being accounted for.

By exploring the relationship between quality of life and economic freedom we can begin to answer some of these questions. It is by understanding the effects of economic freedom on quality of life that we can inform politicians, policy reformers, and pundits. By pairing economic freedom and quality of life data I attempt to draw initial conclusions about the relationship between the two. Using two economic freedom indices (Economic Freedom in North America and Freedom in the 50 States) and Yonk's Quality of Life Index I expect to find that a higher economic freedom will be a predictor for a higher quality of life score.

## **Quality of Life**

In a survey of the quality of life literature, Clark (2008) found that between 1960-2006 over 600 articles appeared with references to "well-being", "happiness" and "life" or "job-satisfaction". Sixty percent of these articles occurred after 2000. Although there has been sustained interest by academics in this topic—since 1960

at least — the recent spike demonstrates a desire to go beyond economic indicators such as per capita income to find more encompassing indicators.

Quality of life measurements cover a wide range of topics from health indicators, to climate, food costs, and restaurants per capita. One of the first studies of life quality, Graves (1976), explained net migration from 1960-1968 using per capita income and growth, the average unemployment rate, the number of physicians per 100,000 people, number of major crimes per 100,000 people, percentage of nonwhite population, average days per year that the temperature was below freezing and average number of micrograms of pollution. One of his most significant findings was that environmental considerations were important in explaining net migration. Also significant is that many of the variables Graves chose for his 1976 study are still included in life quality indices today.

After the 1980s, hedonic price models, or a method of using choice-revealed preferences to estimate demand for certain goods, became more popular in determining inputs into quality of life decisions (Blomquist et al., 1988; Stover and Leven, 1992; Ready et al., 1997; Schmidt and Courant, 2003). Stover and Leven find a preference for counties along the Sun Belt and in Colorado, which influenced my decision to include regional control variables in my model.

Schmidt and Courant measure how much people are willing to pay in the form of lost wages to live in amenity rich areas, demonstrating the importance of amenity offerings in quality of life measures. Sufian (1993) also found that amenities matter and that people are willing to take a 3-4% pay cut in order to live near

amenities. From hedonic pricing models scholars moved on to multivariate analysis, using many of the same variables as Graves in 1976 (Sufian, 1993; Shapiro, 2006; Gyourko and Tracey, 1991; Agostini and Richardson, 1997; Nzaku and Bukenya, 2005; Giannian et al., 1999; Lieske, 1990). Many of these studies also include of amenities as important determinants of life quality.

### **Subjective vs. Objective Debate**

As with any attempts to collect data and use it to make inferences about the greater world most quality of life researchers have debated extensively over the use of subjective data versus objective data. Subjective data generally comes in the form of surveys. Objective measurements are aggregate data, usually collected by a government institution.

Milbrath (1979) argues that “Quality of life research should begin by developing an analytical scheme for mapping human needs, societal needs, and ecosystem needs.” (p. 38). Even in the early days of life quality studies, it was understood that the diverse needs of humans need to be mapped to understand how to meet their needs. Milbrath further argues on behalf of subjective measures citing the fact that there had yet been little correlation shown to occur between subjective and objective measures of the same conditions.

In a sharp change from Millbrath, Gill (1995) argues that the differences between subjective and objective measures are insignificant. He argues that

It is also clear that these so-called “objective” measures are actually proxies for experience identified through “subjective” associations of decision-makers; hence the distinction between objective and subjective indicators is somewhat illusory. (p. 2).

Subjective measures tend to be problematic in ways that make gathering and using the data difficult. This type of measure is difficult to arrange, especially on a large, random scale, and generally are narrow in scope. Additionally, social norms affect the weighting of categories, which means weighting will intrinsically differ across geographies. Authors have found these measures to be heavily influenced by factors occurring during the interview, potentially skewing the data (Diener and Ryan n.d.).

I think the shortcomings of subjective data are enough to warrant their exclusion from this paper. Additionally, because subjective measures are often heavily influenced by factors outside the control of policymakers it doesn't assist policymakers in understanding how they can improve life quality. Additionally subjective measures often suffer from method-variance problems, or variance due to measurement problems, as opposed to the natural deviations between different data points because they are self-reported (Podsakoff et al., 2003).

Stover and Leven argue however that more indices are preferable to fewer because it allows for competition between the different indices, which the authors maintain is a positive development for the longevity of the study of quality of life. Further, that it may be good for the study of life quality to have many quality of life indices because they will have different indicators, creating the variety Milbrath advocated. And, as long as these indices have strong methodological and theoretical foundations then they are valid (Stover and Leven, 1992).

Adding to these objective data is Yonk's Quality of Life Index (YQOLI) (2011). YQOLI is an index that includes five indicators that are aggregated into one quality of life score using 2005 data at the state and county level from the U.S. Census Bureau, Bureau of Labor Statistics, and National Center for Education Statistics. His indicators include education, public safety, infrastructure, health, and economic development. Each of his indicators are composed of one to twelve sub-indicators. Yonk chooses to use objective data for his Index, for similar reasons as I argue above<sup>1</sup>.

While Yonk's index does a fairly thorough job of creating a multifaceted index that touches on all parts of public life, it doesn't address the amenities that are an important factor for individuals, especially as technology allows for more 'footloose' employees who can move easy to improve their life quality. In the discussion above almost every article included had at least one environmental indicator that influenced the overall quality of life score. I think the inclusion of at least one amenity or environmental indicator would greatly enhance Yonk's index. This inclusion however, would be much more informative on the county-level and as such is outside the scope of this paper.

## **Economic Freedom**

One of the driving principles behind Postrel's work are the benefits that can come from the market and how these benefits are expanded as there is more freedom in

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<sup>1</sup> Although his 2010 piece "The Political Impact of Quality of Life" does include the results of a survey used to gather micro level data regarding quality of life.

<sup>2</sup> The Nordic Model is system of comprehensive welfare and high levels of government regulation of labor markets and public spending followed by

markets. As markets expand so does the variation in goods, leading to more diverse tastes being satisfied. This expansion also creates dynamism as “[e]xposure changes tastes”, which allows new firms to enter the marketplace, grow, and eventually leave (Postrel, Location 1044). Postrel’s most ringing endorsement for the importance of factors that increase quality of life and how they relate to economic freedom come in part from a graphic designer, Michael Beirut (quoted material below) and herself.

It will take some time for people to realize that creating the difference between Coke and Pepsi is not just an empty pastime but one of many signs of life in a free society.” The Afghan women who risked the Taliban’s prisons to paint their faces and style their hair in underground beauty shops, and who celebrated the liberation of Kabul by coloring their nails with once-forbidden polish, would agree. Surface may take on meaning, but it has a value all its own. (Location 1633).

Taking “Surface” or the design element of goods, as a potential input to a quality of life measure, Postrel is arguing that free societies are beneficial because they allow individual’s to express themselves, buy the goods that they demand, and ultimately increase the quality of life people can have.

Many of the studies includes the economic freedom data involve traditional economic indicators such as GDP per capita, per capita income, or economic growth. Because of the reliance on using economic freedom to explain economic growth, as opposed to more complete measures of life quality, previous studies were not a strong guide as I began developing my hypothesis. Existing studies illustrate how the use of economic freedom indicators has changed over time. Some of the first explorations into economic freedom involved simple regressions

attempting to explain differences in economic growth. The development and use of the Granger causality model in econometrics shifted the debate from these simple regressions to attempts to clarify if past economic freedom could forecast future economic freedom. Once it was established in several papers that economic freedom caused economic growth scholars began looking at the effects of changes in economic freedom and checking the robustness of their results.

Many of the first papers involving economic freedom used the indices to explain economic growth with a Solow growth model (Easton and Walker, 1997; Gwartney, et al., 1999). Most of these studies were cross-sectional data from 1975-1990 (the dates for which the Fraser's Economic Freedom of the World index data were available). Doucouliagos (2005) in a review of past economic freedom studies, found that there were only two instances of statistical non-significance found between economic freedom and growth, indicating a potential publication bias in the literature. He later confirmed this bias in his meta-significance testing, although he also finds a genuine positive correlation between economic growth and freedom in his meta-analysis.

After the relationship between economic growth and freedom had been fairly well established using growth models Granger-causality tests became more common as researchers attempted to explain if growth caused freedom, or freedom caused growth (Heckelman, 2000; Farr, 1998; Justensen, 2008; Dawson, 2003). Although OLS cannot be used to prove contemporaneous causality, Granger causality tests whether one variable has Granger-caused another variable.

To test for this specific form of causation the dependent variable is regressed on a lag of itself as well as a lag of the independent variable. If the coefficient on the lagged independent variable,  $x_{t-1}$  in equation (1) below, is significant then you have Granger-causality.

$$(1) y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 x_{t-1} + \varepsilon$$

This test requires several panels of data for both the main dependent and independent variable (Dawson, 2003, p. 483).

Dawson finds that the Economic Freedom of the World Index overall indicator Granger-causes growth. Dawson also finds a difference between the effect of the level of economic freedom at one point in time and the effect of a change in economic freedom over time on economic growth; changes in economic freedom better explain economic growth than the level of economic freedom. Justensen (2008) finds the same general result as Dawson. Justensen further finds support for the idea that economic freedom has positive, indirect effects on economic growth.

Once this causal relationship had been established authors began checking for the robustness of the relationship between economic freedom and growth. Sturm and de Haan (2010) and Carlsson and Lundstrom (2002) find robustness in their results supporting the positive relationship between economic freedom and growth.

There is an established, positive relationship between economic freedom and economic growth. The above studies demonstrate that there are tangible

benefits to citizens who are generally free to engage in transactions in the marketplace. This paper will now explore the intangible benefits to life quality that can be achieved with increases in economic freedom.

## **Data**

### **Quality of Life Indicators**

The data collected by Yonk for his quality of life indicators come from the U.S. Census Bureau's 2005 mid estimates. The U.S. Census Bureau codes used are available in his 2011 report. Much of the education data were pulled from the National Center for Education Statistics. Below are descriptions of each of Yonk's indicators.

### **Education**

Funding Effort, Outcomes, and Service Availability are the three sub-indicators in this category. Funding Effort is a Q score composed of the percent of the local budget devoted to education, per pupil spending, and per capita educational payroll. Outcomes is also a Q score including the number citizens between 16 and 19 years old that have not graduated from high school and are not enrolled, college enrollment, and percent with either no high school degree, a high school degree, or college degree. Service Availability is the availability of higher education, charter schools, and private schools collected into a scaled Q score. These Service Availability measures are also used in the World Bank's Human Development Index's education (World Bank, 2013; Agostini and Richardson, 1997).

## **Public Safety**

Public Safety is one of the most common indicators of quality of life in the various indices. Two of the most common sub-indicators are forms of the crime rate, either crimes per 100,000 people or the number of violent crimes (Graves, 1976; Gyourki and Tracey, 1991; Sufian, 1993; Nzaku and Bukenya, 2005; Roback, 1982). After working with his model Yonk concludes that spending on fire and police services work as a good proxy for public safety and are included as the only sub-indicator.

## **Infrastructure**

There are two sub-indicators in this category, Service Availability and Funding Effort. Service Availability is a Q score that accounts for the percentage of households in the state that have access to culinary water, telephone access, and grid fuel. Culinary water provision acts as a proxy for government involvement, and is often accompanied by sewer services. Access to grid fuel is important because it allows residents to safely and conveniently heat their homes and cook. Households with access to telecommunications are able to efficiently communicate with others and at least have access to low-speed internet, which also provides another avenue for communication.

Yonk's second sub-indicator includes public spending on infrastructure as a function of total land area and population. The amount spent on transportation infrastructure is also included here. It is common in other quality of life studies to

use water or waste treatment facilities (Ready et al., 1997; Stover and Leven, 1992; Blomquist et al., 1988). In quality of life studies in urban areas measures of population density, or population change, are common (Nzaku and Bukenya, 2005; Roback, 1982).

## **Health**

Health measures have the most overlap between regional and international quality of life indices. To provide a measure of health care within a state, Yonk's Health indicator includes both health care workers and physicians per 1,000 residents. As a proxy for accessibility Yonk uses health insurance enrollment and includes both public and private insurance companies and programs. Based on the UNDP's Human Development Index Yonk chose to include infant mortality as another measure in this indicator. Graves (1976) and Nzaku and Bukenya (2005) chose to use physicians per 100,000 people while Giannias et al. (1999) use physicians per 1,000 people. Gyourko and Tracey (1991) use hospital beds per 100,000 as a proxy for health care. Infant mortality is a common proxy; Agostini and Richardson (1997) combine infant mortality with maternal mortality and life expectancy (Sufian, 1993; Agostini and Richardson, 1997; World Bank, 2013). Meanwhile, The Economist (2005) solely uses life expectancy.

## **Economic Development**

To attempt to capture the many dimensions of economic growth Yonk created three categories: Availability of Services, Economic Outcomes, and Availability of Private Capital Outside of Urban Areas. For the first category Yonk

compared the total number of employers to the number of new businesses each year. In the second category Yonk employs more traditional economic measures including unemployment rate, per capita income, and economic diversity. Finally, total deposits in commercial banks is used to measure the capital available in rural areas, while total annual payroll, and manufacturing capital expenditures round out the third sub-indicator.

Per capita income is a common proxy for economic development in life quality studies (Graves, 1976; Agostini and Richardson, 1997). Per capita income growth is also used (Graves, 1976) as is unemployment (Roback, 1982; The Economist, 2005). Sufian (1993) finds that food costs greatly influence quality of life in urban areas. Nzaku and Bukenya (2005) form a complex picture of economic development by combining unemployment, amenity sector employment, and per capita income. Global studies often choose GDP per capita (The Economist, 2005; Giannias et al., 1999) while Giannias et al. creates a complex system involving types of consumption to measure economic development including consumer prices, private consumption, and the number of passenger cars, telephones, and televisions per 1,000 people (1999).

Each of the variables mentioned above were then scaled. This scaling system allows for comparison across county and variable type. In order to scale the data so that each indicator lied between 0 and 1 Yonk use the maximum, minimum, and observed variables in the following formula: 
$$\frac{(\textit{Observed Value} - \textit{Minimum Value})}{(\textit{Maximum Value} - \textit{Minimum Value})}$$

(Yonk, 2010). Yonk then took the simple average of all the aggregated sub-

indicators and then re-scaled the data using the same formula above. After all the sub-indicators had been calculated Yonk took the simple average and scaled this average thus arriving at a final, as he designates it, Q Score, for each of his areas of interest—health, economic development, infrastructure, public safety, and education. To get the final quality of life score for each state all of the scores from each area of interest was averaged and scaled according to the same formula as mentioned previously. The use of both simple averages and component analysis as found in Yonk is common in other life quality studies (Doucouliagos, 2005; Djankov et al., 2006). Those interested in the results of the tests done to defend his index should read Chapter 2 in Yonk’s “The Political Impact of Quality of Life”.

### **Economic Freedom in North America**

In the index created by the Frasier Institute (2005) one of the most publicized findings was that “a one-point improvement in economic freedom on the all-government index increases per-capita GDP by \$5,907 ... On the subnational index, a one-point improvement in economic freedom increases per-capita GDP by \$4,515.” (p. 1). Although most scholars interested in economic freedom use the Frasier Institute’s Economic Freedom of the World (EFW) Index, the Economic Freedom in North American (EFNA) index follows a system similar to that used in the EFW, but to illustrate the state of economic freedom in the U.S. and Canada on a state/provincial level. The EFNA includes three indicators, the Size of Government, Takings and Discriminatory Taxation, and Labor Market Freedom. Barriers to trade variable was taken out of this index due to the lack of data.

There is not a single widely used definition of economic freedom in the literature, however most authors include five key areas: “personal choice, voluntary exchange, freedom to compete, and protection of persons and property.” (Gwartney and Lawson, 2003). Ideally, according to the theory of economic freedom, government is only involved in areas that are protective and productive, and to the least degree possible to sufficiently provide public goods such as clean air and national defense (Karabegovic et al., 2005).

### **Size of Government**

Once the government is producing goods that could be supplied by the market, it means there is less space for private production and consumption. This idea is captured in the Size of Government indicator. One of the sub-indicators in this measure is government spending as a percentage of GDP. Also included in this measure are government transfers and subsidies as a percentage of GDP and social security spending, or ways in which the government transfers property from one group to another (Karabegovic et al., 2005).

### **Taking and Discriminatory Taxation**

In the Taking and Discriminatory Taxation portion the authors have created total government revenue from its own practices as a percentage of GDP. Also included are the top marginal income tax rate and the point at which this rate goes into effect. Indirect tax revenue and sales taxes are introduced as a percentage of GDP. Because of the great number of transfers between state and federal

governments in North America the use of government revenue and government spending in the same indicator does not lead to double counting.

### **Labor Market Freedom**

The final area, Labor Market Freedom, includes minimum wage laws, government employment as a percentage of total employment at the same level (i.e. federal, state, and local), and union density. Minimum wage legislation is included because such legislation limits the ability for employers and employees to negotiate compensation individually and could limit employment opportunities for those willing to work under the legal wage. High levels of government employment meanwhile could suggest that the government is supplying goods that citizens would normally be purchasing the marketplace, thus removing the incentive for private market to supply those goods. It could also suggest the existence of quasi-monopolies, or highly regulated industries. Thirdly, union density measures the percent of unionized workers within a state and is also included in this measure.

### **Freedom in the 50 States**

Mercatus' Freedom in the 50 States Index is meant to improve on the Frasier Institute's Economic Freedom in North America and the Pacific Research Institute's U.S. Economic Freedom Index: 2004 by supplying more complete measures of freedom including state fiscal policies and personal freedom indicators (p. 1). In their index fiscal and regulatory policy compose 25% of the overall score, while personal freedom is the remaining 50% (Ruger and Sorens, 2001).

The authors standardize each variable by looking the number of standard deviations that variable is away from the mean, which is less sensitive to outliers. They have weighted their policies according to the number of people affected by that policy. Additionally they chose to measure policies and their enforcement as opposed to policy outcomes.

### **Fiscal Policy**

Their Fiscal Policy indicator measures local government budget constraints, weighted average of state and local government employee earnings compared to private sector earnings. The authors also include aggregate state and local spending, and state and local spending as a percentage of personal income and GSP. Taxation includes state and local tax revenues as a percentage of GSP and personal income, as well as government debt burdens (Ruger and Sorens, 2001).

### **Regulatory Policy**

Regulatory policy includes minimum wage laws, right-to-work laws, and workers compensation. The authors do not include a unionization measures, but the previously mentioned laws correlate with unionization and fulfill the author's guidelines of measurements of policies rather than outcomes. State health insurance regulations, eminent domain, and occupational licensing are also included. Just one-fourteenth of this category is made up by land and environmental regulations, while half of this category is made up of state land use policies and plans (Ruger and Sorens, 2001).

## **Economic Freedom**

This variable is just the addition of the Fiscal Policy and Regulatory Policy indicators.

## **Paternalism**

Paternalism measures how intrusive the government is when it comes to personal freedoms. This category includes gaming/gambling, alcohol regulations, physician assisted suicide, road regulations and campaign finance. The alcohol regulations cover a wide variety of laws including blue laws, taxes, happy hour laws and state control of alcohol distribution. Road regulations include mandatory helmet laws, sobriety checkpoints, open container bans, and cellphone bans. Tobacco bans and laws are included and weighted more heavily than the alcohol sub-indicator. Marriage and civil union laws, forfeiture laws, and “victimless crimes” are included in the same sub-indicator. Marijuana and salvia laws are their own category. Gun control laws make up more of this category than marijuana and salvia laws because of the wide variance in rules and enforcement. The Education subcategory composes one-twelfth of this category. Finally home and private school regulations are included (Ruger and Sorens, 2001). The authors find using regression analysis that a .5 increase in the economic freedom score increases expected migration by 4.2 percentage points.

## **Methodology**

Past studies suggest using a Granger-causality test to determine if increases in economic freedom cause higher levels of quality of life (Heckelman, 2000;

Justensen, 2008; Dawson, 2003). I would expect to see this relationship because as individuals are free to make the best possible choices when it comes to decisions regarding employment, residency, education, investment, income, etc. their decisions result in higher levels of quality of life because all of the goods needed to meet their demands are being supplied by the market (assuming a perfect, or near perfect market exists). (See the discussion at the beginning Economic Freedom section for more detail on why I would expect this result.)

Unfortunately there is only one year of YQOL data, which prevents using a Granger-causality test. Previous studies have also shown stronger results when the authors use changes in economic freedom or growth as opposed to levels of either variable (Justensen, 2008; Gwartney et al., 1999; Easton and Walker, 1997; Dawson, 2003; de Haan and Sturm, 2000; 1999). Again, this type of test isn't possible given the data available. Because this study is the first to explore the relationship between YQOL and economic freedom, and given data limitations it is prudent to use simple OLS regression to test my hypothesis that as economic freedom increases, quality of life also increases.

Because I combine two indices at a time in this study, both of which are composed of many variables, selecting control variables presents its own set of challenges. Additionally, because our data exists on the state level I have a limited number of observations, limiting the variation in our data. Belasen and Hafer ran into similar problems. Based on a careful review of similar studies they found population density to be useful control for differences that may occur due large

population differences. The authors also find support for the use of regional dummy variables, which is replicated in my dataset, using the U.S. Census Bureau divisions and the Midwest as the control, as well as the unemployment rate. It is fairly common among previous studies to use few control variables over concerns about the introduction of endogeneity bias.

## **Results**

Presented below are the results from my statistical analyses of pairing one of the above economic freedom indices with Yonk's Quality of Life Index. Section One concerns the relationship between the Economic Freedom in North America Index and the Quality of Life data. In that section I present the summary statistics for the data, explain the tests that I ran, and explain the results. Section Two includes the tests I ran examining the effect of the Freedom in the 50 States Index on Yonk's Quality of Life data. This section follows the same outline as Section One.

### **Section One**

#### **Economic Freedom in North America & Quality of Life Regression Analysis**

Table 1.1 illustrates the summary statistics from YQOL Indicators and the control variables. Within his indicators the Health Q Score has the largest standard deviation, with Wyoming receiving the highest score and Texas with the least. There also is wide distribution in the Population Index, from the U.S. Census Bureau, with a standard deviation of 250.148.

Table 1.1  
Summary Statistics for Quality of Life Q Scores and Control Variables

	Obs.	Mean	Std. Dev.	Min	Max
Education Q	50	.355	.134	.0001	.708
Health Q	50	.422	.245	0	.9998
Economic Q	50	.416	.207	-.0022	.920
Public Safety Q	50	.206	.111	0	.476
Infrastructure Q	50	.258	.104	.0001	.451
QOLQ	50	.196	.103	0	.408
Northwest	50	.18	.388	0	1
South	50	.32	.471	0	1
West	50	.26	.443	0	1
Pop. Density	50	181.916	250.148	1.1	1134.4

Note: The Q Scores are from Yonk (2010). The control variables are from the U.S. Census Bureau.

Table 1.2 has the summary statistics for the Frasier Institute's Economic Freedom in North America (2003). In the chart, FSL stands for Federal, State, and Local, while SL stands for State and Local, indicating the level of government that the data are from. We see the most deviation in the Size of Government Indicator at the State and Local level.

Table 1.2  
Summary Statistics for the Economic Freedom of  
North America Index

Variable	Observations	Mean	Std. Dev.	Min	Max
Overall FSL	50	6.846	.617	5.3	8.6
Overall SL	50	6.97	.701	5.1	8.4
Size of Gov't SL	50	6.892	1.03	3.8	8.8
Takings & Taxes SL	50	7.064	.771	5.3	9.1
Labor Market SL	50	6.948	.755	5.4	8.7

Note: The economic freedom data is from the Frasier Institute's Economic Freedom in North America Index.

### Regression 1.1

#### Quality of Life and Overall Freedom at the FSL Level

$$QOLQ = \alpha + \beta_1 \text{OverallScoreFSL} + \beta_2 \text{PopulationDensity} + \beta_3 \text{North} + \beta_5 \text{South} + \beta_6 \text{West} + \beta_7 \text{UnemploymentRate} + \varepsilon$$

R<sup>2</sup>: 0.6594

Adj. R<sup>2</sup>: 0.6118

Variable	Coefficient	Std. Error	P Value
Overall FSL	.057	.015	0.001**
Pop Density	.0002	.0005	0.002**
North	-.0201	.035	.57
South	-.146	.025	0.000***
West	-.0252	0.26	0.345
Unemp. Rate	-.002	.009	0.825
Constant	-.155	.122	.21

P\* < .10 P\*\* < .05 P\*\*\* < .01

In our simple OLS regression I find that a one-point increase in a state's Overall Economic Freedom Level at the federal, state, and local level has an expected, statistically significant increase of .057 in its Quality of Life Q Score. We also see a statistically significant relationship between QOLQ and population density, this result was common across all my tests. There is also a negative and statistically significant relationship between the South and Quality of Life. This result follows similar findings by Yonk using his Quality of Life Indicators.

## Regression 1.2

### Quality of Life and Overall Freedom at the SL Level

$$\text{QOLQ} = \alpha + \beta_1 \text{OverallScoreSL} + \beta_2 \text{PopulationDensity} + \beta_3 \text{North} + \beta_5 \text{South} + \beta_6 \text{West} + \beta_7 \text{UnemploymentRate} + \varepsilon$$

$R^2: 0.5924$

Adj.  $R^2: 0.5356$

Variable	Coefficient	Std. Error	P Value
Overall SL	.0345	.0164	.041**
Pop Density	.0002	.0001	.001***
North	-.0318	.0382	.41
South	-.1608	.0275	.000***
West	-.0278	.0289	.343
Unemp. Rate	.0017	.0109	.875
Constant	-.0212	.1433	.883

$P^* < .10$   $P^{**} < .05$   $P^{***} < .01$

Using the Overall Economic Freedom at the state and local level I also find a positive, significant relationship between economic freedom and quality of life. In this regression I find that a one-point increase in a state's overall freedom at the state and local level increases the expected Quality of Life Q Score by .0345 points. Again, Population Density and the South have a statistically significant relationship with the QOLQ Score and the same sign as in Regression 2.1. The sign on the unemployment rate has switch, although the unemployment's effect is quite small and not statistically significant.

## Section Two

### Freedom in the 50 States and Quality of Life Regression Analysis

Table 2.1 shows the summary statistics for the Mercatus Center's Freedom in the 50 States. Included is the summary of both the final score and the rank, similar to Belasen and Hafer. The largest deviation is in the overall score, which isn't surprising given that the overall score is just the fiscal, regulatory and personal

freedom scores combined. There is much more uniformity in the ranking of these indicators, when compared to YQOL Q Scores.

Table 2.1  
Summary Statistics for Freedom in the 50 States by Score and Rank

	Obs.	Mean	Std. Dev.	Min	Max
Fiscal Score	50	4.295	25.251	-82.422	61.932
Regulatory Score	50	-4.602	17.891	-49.846	28.829
Economic Score	50	-.307	33.875	-112.234	59.821
Personal Score	50	12.04	8.584	-.368	33.309
Overall Score	50	11.733	36.009	-112.51	79.973
Fiscal Rank	50	25.5	14.577	1	50
Regulatory Rank	50	25.5	14.577	1	50
Economic Rank	50	25.5	14.577	1	50
Personal Rank	50	25.5	14.577	1	50
Overall Rank	50	25.5	14.577	1	50

Note: The economic freedom data is from the Mercatus' Freedom in the 50 States Index.

### Regression 2.1

#### Quality of Life and Freedom in the 50 States

$$QOLQ = \alpha + \beta_1 \text{OverallFreedom} + \beta_2 \text{Unemployment Rate} + \beta_3 \text{Population Density} + \beta_5 \text{North} + \beta_6 \text{South} + \beta_7 \text{West} + \varepsilon$$

R<sup>2</sup>: 0.6030  
Adj. R<sup>2</sup>: 0.5476

Variable	Coefficient	Std. Error	P Value
Overall SL	.0002	.011	0.502
Unemp. Rate	-.0237	.00005	0.044**
Pop Density	.0002	.0375	0.000***
North	-.0432	.0284	0.256
South	-.1294	.032	0.000
West	-.002	.0556	00.95
Constant	.324	.0003	0.000

P\* < .10 P\*\* < .05 P\*\*\* < .01

Using the Freedom of the 50 State Index I was unable to find a statistically significant relationship between economic freedom and quality of life. After running the test mentioned in Regression 2.1 I ran through the following tests:

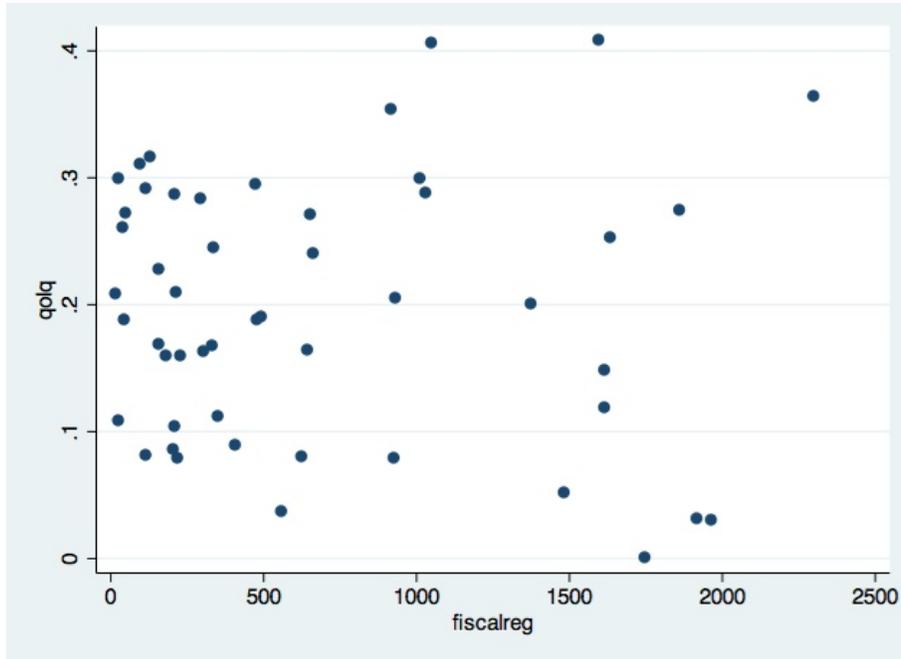
$$\begin{aligned} \text{Aggregated QOL} &= \alpha + \beta_1 \text{Aggregated Freedom} + \varepsilon \\ \text{QOL Indicators} &= \alpha + \beta_1 \text{Aggregated Freedom} + \varepsilon \\ \text{Aggregated QOL} &= \alpha + \beta_1 - 4 \text{Freedom Indicators} + \varepsilon \\ \text{QOL Indicators} &= \alpha + \beta_1 - 4 \text{Freedom Indicators} + \varepsilon. \end{aligned}$$

None of these tests turned up significant results however. Because of some high correlations (correlation tables are available in the appendix) between the variables and the high  $R^2$  despite the lack of significant explanatory variables I had concerns about multicollinearity in the data. Instead of choosing which variable to drop in order to correct the multicollinearity that was occurring I ran a forward selection stepwise regression. This test allows STATA to choose the independent variable that has the strongest relationship with our QOLQ Score and regress the residual from STATA's independent variable choice on my first independent variable choice. If the t-statistic from this regression is high enough then STATA reruns the regression using that residualized independent variable.

After this more extreme econometric testing did not turn up any results I used the method that Belasen and Hafer used in their 2012 paper and reran my tests using the Freedom in the 50 States Rankings, as opposed to the state's scores. Through this system I was not able to identify any significant relationships between our variables of interest (only Population Density and the South had statistically significant relationships and in the same direction as in all other tests). During these tests however I did plot each state's score against its ranking, including the overall and indicators rankings. I did find the unexpected result visible in Graphic 2.1 below.

Graphic 2.1

Plot of Quality of Life Q Score Against the Interaction of Fiscal Freedom Ranking and Regulatory Ranking



In Graphic 2.1 there is a tight clumping around lower levels of the interaction between fiscal and regulatory freedom. As this freedom increases however we see increased dispersion, indicating that as states with lower levels of the interaction between fiscal and regulatory freedom begin to become increasingly free they can expect to see a change for the better or worse in their quality of life. This clumping indicates heteroscedasticity, as such I ran both the White and Breusch-Pagan tests for heteroscedasticity, and I was unable to reject the null hypothesis of homoscedasticity. Potential causes for this clumping are explored in the Discussion section below.

## **Discussion**

The purpose of this paper was to explore the relationship between Yonk's Quality of Life Index, and two economic freedom indices, Economic Freedom in North America and Freedom in the 50 States. I was able to find statistically significant relationships between Yonk's Quality of Life Index and both of the Overall Economic Freedom in North America Indicators. I found positive relationships between economic freedom at the federal, state, and local levels, and quality of life (EFNA), as well as between economic freedom at the state and local levels and quality of life (EFNA). This finding adds to the understanding of the importance of economic freedom, and has already found wide support for the hypothesis that increases in economic freedom has positive benefits.

Quality of life indices provide a holistic representation of the factors that improve people's lives over time. These measures are necessary because they fill in gaps left by traditional economic variables. Additionally, quality of life estimates offer policymakers a dynamic picture of the services citizens are using to fulfill their demands. By employing statistical analysis the relationship between quality of life and economic freedom can be better understood, which can continue to inform policy discussions.

I was unable, however, to find any statistical support for my hypothesis that as there were increases in the Freedom of the 50 States Indicators, there would also be increases in Quality of Life Indicators. The findings during tests between FFS and YQOL lead me to suspect that there is a point where quality of life reaches

a high enough level that individuals move away from demanding more economic freedoms and are more willing to invest their resources into public services that benefit others, similar to the Nordic Model<sup>2</sup> (Anderson et al., 2007). Better data will be required to test these suspicions. More observations of both Yonk's Quality of Life and Freedom in the 50 States would be needed in order to perform more rigorous statistical analysis.

Another potential area that requires more exploration is the relationship between the Regulatory and Fiscal Indicators in the Freedom of the 50 States Index. In Graphic 2.1 there appears to be clustering around low levels of economic freedom. As economic freedom increases we see more dispersion in the quality of life scores. This dispersion could indicate that as states become more economically free citizen's preferences change and they demand more public services and how these are supplied affects their quality of life scores. Testing needs to be done to verify that this clustering is more than an anomaly.

As always more and better data are needed so that researchers can better understand the relationship between quality of life and economic freedom. The addition of more quality of life data across more time to Yonk's database would be helpful in determining Granger-causality. Additional years of quality of life data would also be helpful in testing for the effects of changes in economic freedom on changes in quality of life. Using variables that change over time has added greatly

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<sup>2</sup> The Nordic Model is system of comprehensive welfare and high levels of government regulation of labor markets and public spending followed by unexpected levels of economic growth found in Denmark, Sweden, Iceland, and Finland (Anderson et al., 2007, p. 13-14).

to the understanding of economic growth and economic freedom, and I expect to see the same growth in understanding between quality of life and economic freedom.

Additionally county-level economic freedom data could be paired with Yonk's county-level quality of life data, which would give much more variance to our data and improve the reliability of our results. Creating such a database would also greatly enhance our understanding of the effects of economic and fiscal policies on quality of life at a more micro level.

The spike in the quality of life studies, beginning in 2000 demonstrates that scholars at least, are increasingly curious about what factors influence quality of life, the weight that those factors have, and how quality of life can be improved. Additionally, the growth in quality of life indices by multinational governmental organizations and newspapers, e.g. The World Bank and The Economist, demonstrates that policymakers and pundits are noticing the importance of quality of life.

Postrel maintains that "on the margin, aesthetics matter more and more." and as aesthetics continue to improve they will necessitate improvements in quality of life measurements (Location 215). Developing an understanding of the causes of quality of life, as well as more thorough life quality indices will allow those innovative scholars the opportunity to predict changes in citizen's demands.

The results found in this paper add to the studies asserting the positive effects of economic freedom and continue the push for more and increasingly

comprehensive quality of life measures. As long as exposure to increases in economic freedom continue then tastes will change, requiring quality of life indices dynamic enough to account for, if not predict this change. Unfortunately policymakers in the United States don't appear to be concerned about the potential benefits they are missing by limiting economic freedom. Although there appears to be little but money that can change the minds of policymakers I hope this additional understanding in the relationship between quality of life and economic freedom helps tip the scales.

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